

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-337432

(43)Date of publication of application : 06.12.1994

(51)Int.Cl.

G02F 1/1343

G02F 1/1335

G02F 1/1335

(21)Application number : 05-127573

(71)Applicant : TOPPAN PRINTING CO LTD

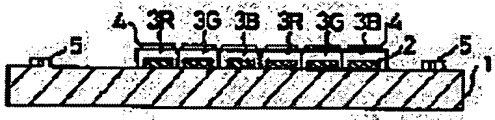
(22)Date of filing : 28.05.1993

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(54) BACK ELECTRODE PLATE FOR LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:

PURPOSE: To provide a back electrode plate for a liquid crystal display by which a display defect is not caused while maintaining an advantage of a reflection type liquid crystal display and an angle of visibility becomes wide out of relation to a position of an external light source and bright image screen display becomes possible.



CONSTITUTION: In this back electrode plate, the principal part is composed of a glass substrate 1, rectangular white layers 2 arranged respectively in parts corresponding to picture element patterns on this substrate, color filter layers 3R, 3G and 3B and transparent electrodes 4. A beam of light incident on a picture element part is emitted by being scattered and reflected by the white layers 2, on the one hand, the beam of light incident on the other part is not reflected by the white layers 2, so that contrast of a display image screen can be improved. Since the white layers 2 have an insulating property, the transparent electrodes 4

are not short-circuited to each other through these white layers 2, so that image screen display having no defect becomes possible.

LEGAL STATUS

[Date of request for examination] 07.04.2000

[Date of sending the examiner's decision of rejection] 30.07.2002

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

4) [Patent number]

5) [Date of registration]

6) [Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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[Claim(s)]

[Claim 1] The back plate plate with which two or more color filter layers and the transparent electrode corresponding to each rectangle-like pixel were prepared in the shape of a pattern in the screen-display field on a substrate, In the above-mentioned back plate plate for liquid crystal displays which is equipped with the liquid crystal matter enclosed between the observer lateral electrode plate which countered this back plate plate and has been arranged, and electrode plates, such as this, and impresses and carries out a screen display of the electrical potential difference for every pixel to this liquid crystal matter The back plate plate for liquid crystal displays characterized by preparing the white layer insulating in the same configuration as a pixel configuration between the substrates of a part and color filter layers corresponding to each above-mentioned pixel.

[Claim 2] The back plate plate for liquid crystal displays according to claim 1 characterized by preparing at least pixel Mabe on the above-mentioned substrate the black matrix.

[Claim 3] The back plate plate with which two or more color filter layers and the transparent electrode corresponding to each rectangle-like pixel were prepared in the shape of a pattern in the screen-display field on a substrate, In the above-mentioned back plate plate for liquid crystal displays which is equipped with the liquid crystal matter enclosed between the observer lateral electrode plate which countered this back plate plate and has been arranged, and electrode plates, such as this, and impresses and carries out a screen display of the electrical potential difference for every pixel to this liquid crystal matter The back plate plate for liquid crystal displays characterized by preparing the above-mentioned color filter layer in the part corresponding to each pixel on this white layer, and preparing at least pixel Mabe on the above-mentioned white layer the black matrix while the insulating white layer is uniformly prepared on the above-mentioned substrate.

[Claim 4] The back plate plate for liquid crystal displays according to claim 1, 2, or 3 characterized by preparing the electromagnetic-induction input line which can input a signal by the external magnetic field between the above-mentioned substrate and an insulating white layer.

[Claim 5] The back plate plate for liquid crystal displays according to claim 1, 2, or 3 characterized by preparing the signal line which is connected to the above-mentioned transparent electrode and impresses a signal level to this transparent electrode between the above-mentioned substrate and an insulating white layer.

[Claim 6] The back plate plate for liquid crystal displays according to claim 1, 2, 3, 4, or 5 characterized by preparing the alignment mark which consisted of same ingredients as an insulating white layer in the part outside the screen-display field on the above-mentioned substrate.

[Claim 7] The back plate plate for liquid crystal displays according to claim 1, 2, 3, 4, 5, or 6 characterized by preparing the flattening layer to which it is constituted by transparence resin and flattening of the front face is carried out on the above-mentioned color filter layer.

[Detailed Description of the Invention]

[0001]

[Industrial Application] The back plate plate applied to a reflective mold liquid crystal display is started, and especially, this invention does not have a display defect, and it relates to amelioration of the tooth-back substrate for liquid crystal displays in which a bright screen display is possible while the angle of visibility is also large.

[0002]

[Description of the Prior Art] That principal part consists of liquid crystal matter by which this kind of liquid crystal display was generally enclosed between the electrode plate of the pair in which the polarization film and a transparent electrode were prepared respectively, and electrode plates, such as this. And while making into the linearly polarized light first the beam of light which carried out incidence by the polarization film by the side of incidence, and impressing an electrical potential difference for

every pixel to the above-mentioned liquid crystal matter and changing the orientation condition, rotate the plane of polarization of the above-mentioned linearly polarized light which penetrates the part according to the orientation condition, embrace the angle of rotation, the above-mentioned linearly polarized light is made to intercept or penetrate by the polarization film by the side of outgoing radiation, and a screen display is performed.

[0003] In addition, in the color liquid crystal display which displays a color screen, the color filter layer for coloring polarization either of the above-mentioned electrodes is prepared.

[0004] And as this kind of a liquid crystal display, the light source (lamp) is arranged on the rear face or side face of an electrode plate (a back plate plate is called below) which it is located in the tooth-back side of a liquid crystal display, and the formula transparency mold liquid crystal display with a built-in lamp of the bright back light mold of a display screen to which incidence of the beam of light was carried out from the tooth-back radical electrode plate side, or a light guide mold has spread widely.

[0005] However, in this formula transparency mold liquid crystal display with a built-in lamp, in order that power consumption with that lamp might consume displays of other classes, such as CRT and a plasma display, and the power of an abbreviation EQC greatly, it had the fault from which the description of the low power of liquid crystal display original is spoiled, and use of long duration becomes difficult at a carrying place.

[0006] On the other hand, the reflective mold liquid crystal display which is made to carry out incidence of the outdoor daylight, such as indoor light and the natural light, from the electrode plate (for an observer lateral electrode plate to be called) located in the observer side of equipment, is made to reflect by the metallic reflection film prepared in the above-mentioned back plate plate, and carries out a screen display by this reflected light is also known, without building in such a lamp. And since a lamp is not used in this equipment, power consumption has the advantage that it is small, therefore equal to the long duration drive of a carrying place.

[0007] and as a back plate plate applied to such a reflective mold liquid crystal display For example, the metallic reflection film b uniformly formed on Substrate a and this base material a as shown in drawing 8 The thing by which that principal part was constituted from a transparent electrode d prepared through the color filter layers cR, cG, and cB on this metallic reflection film b, or the thing by which, as for the above-mentioned transparent electrode d, the above-mentioned metallic reflection film b was uniformly formed on the a-th page of the substrate of the opposite side as shown in drawing 9 is known.

[0008]

[Problem(s) to be Solved by the Invention] By the way, in this kind of reflective mold liquid crystal display, since the above-mentioned metallic reflection film b reflected an incident ray regularly, it had the trouble that an angle of visibility was restricted by the location of the light source of that outdoor daylight.

[0009] Moreover, since the metallic reflection film b was constituted by the conductive high metal in the back plate plate of the structure shown in drawing 8, there was a fault which a transparent electrode d tends to connect with the metallic reflection film b too hastily through the minute defect of the color filter layers cR, cG, and cB. And in order to impress an electrical potential difference to other transparent electrodes through the above-mentioned metallic reflection film b when it connects with two or more transparent electrodes too hastily, and an electrical potential difference is impressed to the transparent electrode of 1 for a liquid crystal drive, it had the trouble of trouble having arisen in a liquid crystal drive and being easy to cause a display defect.

[0010] On the other hand, also in the back plate plate of the structure shown in drawing 9, since the above-mentioned metallic reflection film b was exposed to a front face, it was easy to take lessons for a blemish in a manufacture phase etc. from this metallic reflection film b, and the trouble which causes a display defect on the occasion of a screen display was.

[0011] This invention was made paying attention to such a trouble, and the place made into the technical problem is for there to be no display defect, to be concerned with the location of the outdoor daylight light source, and offer the back plate plate for liquid crystal displays in which a screen display [be / nothing] with an angle of visibility bright large moreover is possible, with the advantage of a reflective mold liquid crystal display maintained.

[0012]

[Means for Solving the Problem] Namely, the back plate plate with which two or more color filter layers and the transparent electrode corresponding to each rectangle-like pixel in invention concerning claim 1 were prepared in the shape of a pattern in the screen-display field on a substrate, It has the liquid crystal matter enclosed between the observer lateral electrode plate which countered this back plate plate and has been arranged, and electrode plates, such as this. It is characterized by preparing the white layer insulating in the same configuration as a pixel configuration between the substrates of a part and color

filter layers corresponding to each above-mentioned pixel on the assumption that the above-mentioned back plate plate for liquid crystal displays which impresses and carries out a screen display of the electrical potential difference for every pixel to this liquid crystal matter.

[0013] And according to the electrode plate concerning this claim 1, in order to be scattered on homogeneity by the above-mentioned insulating white layer, and to be reflected and to carry out outgoing radiation of the beam of light which carried out incidence to the picture element part from the observer lateral electrode plate from an observer side substrate, it becomes possible for whenever [incident angle / of that incident ray] not to be caused how, but to make the bright display screen observe in all directions of it.

[0014] Moreover, since the above-mentioned insulating white layer is prepared in the part corresponding to each pixel on a substrate and it is not prepared in other parts, it also becomes possible not to be reflected by the above-mentioned white layer and to raise the contrast of the display screen of the beam of light which carried out incidence to parts other than a picture element part.

[0015] Furthermore, the metallic reflection film is different from the conventional thing prepared uniformly on a substrate side, and the above-mentioned white layer is insulation, and since a short circuit is not produced among two or more transparent electrodes through this white layer, in case it impresses an electrical potential difference to the transparent electrode of 1 and drives the liquid crystal matter, the screen display of it which other transparent electrodes do not drive and does not have a defect becomes possible.

[0016] In addition, when at least pixel Mabe on the above-mentioned substrate equips (the clearance section of a pixel and a pixel) with a black matrix in the back plate plate for liquid crystal displays concerning claim 1, since the light which carried out incidence to this part is absorbed by the above-mentioned black matrix, it becomes possible to raise contrast of it more. Moreover, the fall of contrast is not produced whether the above-mentioned white layer exists in the black matrix bottom since incident light is absorbed by this black matrix, or it forms a white layer uniformly on a substrate. Invention concerning claims 2-3 is made from such a reason for technical.

[0017] Namely, invention concerning claim 2 is premised on the back plate plate for liquid crystal displays concerning claim 1. Invention which is characterized by preparing at least pixel Mabe on the above-mentioned substrate the black matrix, and relates to another side and claim 3 The back plate plate with which two or more color filter layers and the transparent electrode corresponding to each rectangle-like pixel like invention concerning claim 1 were prepared in the shape of a pattern in the screen-display field on a substrate, It has the liquid crystal matter enclosed between the observer lateral electrode plate which countered this back plate plate and has been arranged, and electrode plates, such as this. While the insulating white layer is uniformly prepared on the above-mentioned substrate on the assumption that the above-mentioned back plate plate for liquid crystal displays which impresses and carries out a screen display of the electrical potential difference for every pixel to this liquid crystal matter It is characterized by preparing the above-mentioned color filter layer in the part corresponding to each pixel on this white layer, and preparing at least pixel Mabe on the above-mentioned white layer the black matrix.

[0018] And in invention concerning claims 1-3, as the above-mentioned insulating white layer, the thing to a visible ray with a wavelength of 400-700nm which has a high reflection factor is desirable, for example, the resin constituent coat which distributes white pigments and changes in a resin binder is mentioned.

[0019] As the above-mentioned white pigments, in order to increase the reflection factor of a visible ray, in a visible region, what has a high refractive index is desirable, for example, inorganic system white pigments, such as titanium oxide, a zirconium dioxide, an aluminum oxide, and lead oxide, can be applied. Moreover, the protective coat which consists of an inorganic compound further on what coated the front face of these inorganic system white pigments with the metal coat of a high reflection factor, or this metal coat may be covered.

[0020] On the other hand, the resin which adds water soluble resin, a surfactant or an organic solvent, etc. to resin, such as resin which denaturalized resin, such as mixture of resin, such as an epoxy resin, acrylic resin, polyester resin, melamine resin, styrene resin, silicon resin, polyimide resin, and this, or this, to water solubility or alkali fusibility, and this, and grows into it that what is necessary is just what can be borne like a transparent electrode formation process or a liquid crystal display assembler as resin BAINTA which distributes white pigments, such as this, is applicable. Moreover, application of what added a curing agent, a photopolymerization initiator, or the polymerization inhibitor that raises the preservation stability before use is also possible to the photo-setting resin constituent which mixed the photoreaction nature monomer to resin, such as this, and gave the photoresist to it, and this photo-setting

resin constituent.

[0021] In addition, it is also possible by stopping the mixing percentage of white pigments comparatively low, and making the above-mentioned white layer semi-permeable to use as a back plate plate of a transfective LCD (liquid crystal display which turns on and carries out a screen display of the lamp built in the liquid crystal display rear face under the dark room, is made to reflect outdoor daylight under a ** room, and carries out a screen display).

[0022] Moreover, as a black matrix concerning claims 2-3, the black photopolymer containing carbon black, a black organic pigment, or a color-enhancing black thermosensitive color-enhancing pigment is applicable.

[0023] And after applying this black photopolymer and forming that coat, it is possible to form a black matrix at least in above-mentioned pixel Mabe alternatively with the application of a FOTORISO process. Moreover, a pixel pitch can apply black printing ink as the above-mentioned black matrix in the comparatively coarse electrode plate which is about several mm, can print this black printing ink at least to pixel Mabe, and can also form a black matrix. As these print processes, offset printing, intaglio offset printing, screen-stencil, flexographic printing, etc. can be used. In addition, this black matrix may be prepared in the bottom of the above-mentioned color filter layer, and may be established on a color filter layer.

[0024] Here, in the back plate plate for liquid crystal displays concerning claims 1-3, since the above-mentioned insulating white layer prevents light transmission, even if it is the case where a conductive pattern is prepared in the white layer bottom of the part corresponding to a pixel, this conductive pattern is interrupted by the above-mentioned white layer, and is not observed from the display screen. Therefore, it becomes possible to prepare a conductive pattern in the above-mentioned white layer bottom, and to use this conductive pattern for various applications. As such an application, while an observer observes the display screen, the input line which brings a magnetic pen close to the part, and inputs a signal into the liquid crystal display can be illustrated. Moreover, it is also possible to use as a signal line to which the impedance at the time of impressing an electrical potential difference to a transparent electrode is reduced.

[0025] Invention concerning claims 4 and 5 is made based on such a reason for technical, and relates to invention which raised the function of a liquid crystal display.

[0026] Namely, invention concerning claim 4 is premised on the back plate plate for liquid crystal displays according to claim 1, 2, or 3. Invention which the electromagnetic-induction input line which can input a signal is characterized by being prepared between the above-mentioned substrate and an insulating white layer, and requires it for another side and claim 5 by the external magnetic field The signal line which is connected to the above-mentioned transparent electrode on the assumption that the back plate plate for liquid crystal displays according to claim 1, 2, or 3, and impresses a signal level to this transparent electrode is characterized by being prepared between the above-mentioned substrate and an insulating white layer.

[0027] As an ingredient which constitutes the above-mentioned electromagnetic-induction input line or a signal line in invention concerning claims 4 and 5, such as this, transparence electric conduction film, such as metal thin films, such as a chromium metal and metal copper, and ITO, can be applied, and it can form by carrying out patterning of these according to a well-known FOTORISO process.

[0028] in addition, as the approach of connecting the signal line prepared on the substrate, and the transparent electrode prepared on the above-mentioned insulating white layer and the color filter layer in invention concerning claim 5 For example, while extending so that the above-mentioned transparent electrode may be set as the same configuration as a pixel pattern and the edge of a transparent electrode and the edge of the above-mentioned signal line may be made to project a little outside the above-mentioned white layer and a color filter layer The approach of extending the part where the above-mentioned transparent electrode was extended to a lower part side along the side face of the above-mentioned white layer and a color filter layer, and connecting to the edge of the above-mentioned signal line is mentioned.

[0029] Next, in case the back plate plate for liquid crystal displays concerning this invention is manufactured, it is possible to form the alignment mark used at back processes, such as a color filter formation process and a transparent electrode formation process, according to the time of formation of the above-mentioned white layer, and it is also possible to form the flattening layer constituted with transparence resin on the above-mentioned color filter layer, and to make a transparent electrode forming face flat.

[0030] Invention concerning claims 6 and 7 is made from such a reason.

[0031] Namely, invention concerning claim 6 is premised on the back plate plate for liquid crystal displays

according to claim 1, 2, 3, 4, or 5. Invention which is characterized by preparing the alignment mark which consisted of same ingredients as an insulating white layer in the part outside the screen-display field on a substrate, and relates to another side and claim 7 It is characterized by preparing the flattening layer to which it is constituted by transparence resin on the assumption that the back plate plate for liquid crystal displays according to claim 1, 2, 3, 4, 5, or 6, and flattening of the front face is carried out on the above-mentioned color filter layer.

[0032] In addition, the resin which adds other organic materials (for example, a reactant monomer, a curing agent, a reaction initiator, an organic solvent, a surfactant, etc.) to the mixture of resin, such as an epoxy resin, acrylic resin, polyester resin, melamine resin, silicon resin, HORIIMIDO resin, and this, or these resin, and grows into it is [that what is necessary is just what can bear heat treatment at the time of assembling a liquid crystal display and a penetrant remover as an ingredient applicable to the above-mentioned flattening layer in invention concerning claim 7] applicable.

[0033] Moreover, since the above-mentioned surface smoothness is required to the periphery seal section to which a demand of the cel gap precision in the liquid crystal cell with which liquid crystal is enclosed carries out the seal of a back plate plate and the observer lateral electrode plate in liquid crystal displays, such as a severe STN liquid crystal display, a ferroelectric liquid crystal display, and an antiferroelectricity liquid crystal display, the above-mentioned flattening layer may be prepared to this periphery seal section.

[0034] In invention concerning claims 1-7, such as this, as the above-mentioned substrate, a glass plate, a ceramic plate, plastic film, a plastics board, etc. can be used, and you may have the color of arbitration. Moreover, it may be backed with a metal plate in order to raise heat dissipation nature and rigidity.

[0035] Moreover, in invention concerning claims 1-7, the above-mentioned color filter layer applies uniformly the photopolymer with which the organic pigment was distributed, and negatives can be exposed and developed according to a well-known FOTORISO process, and it can form, or it can form this by the approach of dyeing with a color the resin film by which patterning was carried out etc. Moreover, it is also possible to print the printing ink containing a coloring agent by print processes, such as offset printing, intaglio offset printing, screen-stencil, and flexographic printing, and to form it.

[0036] On the other hand, the ITO thin film which mixes tin oxide as a dopant and changes in indium oxide as the above-mentioned transparent electrode, the thin film constituted by adding a zirconium dioxide, titanium oxide, or a magnesium oxide in indium oxide, or the thin film constituted by adding an aluminum oxide and a fluorine in a zinc oxide is applicable.

[0037] In addition, the back plate plate concerning this invention can be applied as a back plate plate of various reflective mold liquid crystal displays, such as TN (twist pneumatic) mold liquid crystal display, a STN (super twist pneumatic) mold liquid crystal display, a ferroelectric liquid crystal display, an antiferroelectricity liquid crystal display, a HOMEOTORO pick liquid crystal display, a polymer dispersed liquid crystal display, and a guest host mold liquid crystal display.

[0038]

[Function] According to invention concerning claims 1 and 2 and claims 6 and 7, the white layer insulating in the same configuration as a pixel configuration is prepared between the substrates of a part and color filter layers corresponding to each pixel. Moreover, while the insulating white layer is uniformly prepared on the substrate according to invention concerning claim 3 and claims 6 and 7 Since the above-mentioned color filter layer is prepared in the part corresponding to each pixel on this white layer and the black matrix is prepared at least for pixel Mabe on the above-mentioned white layer, In order to be scattered on homogeneity by the above-mentioned white layer, and to be reflected and to carry out outgoing radiation of the beam of light which carried out incidence to the picture element part from the observer lateral electrode plate from an observer side substrate, it becomes possible for whenever [incident angle / of the incident ray] not to be caused how, but to make the bright display screen observe in all directions of it.

[0039] Furthermore, in the back plate plate for liquid crystal displays concerning claims 1 and 2 and claims 6 and 7, the above-mentioned insulating white layer is prepared in the part corresponding to each pixel on a substrate, and it is not prepared in other parts. Moreover, since the black matrix is prepared at least for pixel Mabe in the back plate plate for liquid crystal displays concerning claim 3 and claims 6 and 7, It also becomes possible not to be reflected by the above-mentioned white layer and to raise the contrast of the display screen of the beam of light which carried out incidence to parts other than a picture element part.

[0040] Moreover, the metallic reflection film is different from the conventional thing prepared uniformly on a substrate side, and the above-mentioned white layer is insulation, and since a short circuit is not produced among two or more transparent electrodes through this white layer, in case it impresses an

electrical potential difference to the transparent electrode of 1 and drives the liquid crystal matter, the screen display of it which other transparent electrodes do not drive and does not have a defect becomes possible.

[0041] Since especially the light by which incidence was carried out at least to above-mentioned pixel Mabe since the black matrix was prepared at least for pixel Mabe on a substrate or the white layer prepared uniformly according to invention concerning claims 2 and 3 is absorbed by the black matrix, it becomes possible [aiming at improvement in contrast further].

[0042] Next, since the electromagnetic-induction input line which can input a signal by the external magnetic field is prepared between the above-mentioned substrate and the insulating white layer according to invention concerning claim 4, According to invention which becomes possible [inputting a signal by bringing a magnetic pen close to the display screen] while an observer observes the display screen, and relates to claim 5 Since the signal line which is connected to a transparent electrode and impresses a signal level to this transparent electrode is prepared between the above-mentioned substrate and the insulating white layer, it becomes possible to reduce the impedance at the time of impressing an electrical potential difference to the above-mentioned transparent electrode.

[0043]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0044] [Example 1] the back plate plate for liquid crystal displays concerning this example it is shown in drawing 1 - drawing 2 -- as -- the pixel pattern on a glass substrate 1 and this glass substrate 1 with a thickness of 0.7mm (the shape of a rectangle 90 micrometers wide [1 pixel :] and 310 micrometers long --) The pitch of an array : The white layer 2 of the shape of a rectangle prepared in the part corresponding to 110 micrometers of longitudinal directions, and 330 micrometers of lengthwise directions, With the same ingredient as this white layer 2, and the alignment mark 5 formed in the part outside a screen-display field at coincidence, The color filter layers 3R, 3G, and 3B of three colors (red, green, blue) which the above-mentioned white layer 2 is made to carry out location adjustment, and are prepared in it, and have a stripe configuration with a width of face of 110 micrometers, The principal part consists of color filter layers 3R and 3G, such as this, and a transparent electrode 4 which consists of ITO with a thickness of 0.24 micrometers arranged in the shape of a stripe on 3B.

[0045] In addition, after making it distribute in an acrylic photopolymer and applying uniformly the white pigments which consist of titanium oxide on the above-mentioned glass substrate 1, according to a FOTORISO process, patterning of the above-mentioned white layer 2 and the alignment mark 5 is carried out, and they are formed.

[0046] Moreover, the above-mentioned color filter layers 3R, 3G, and 3B are SMX by TOYO INK MFG. CO., LTD. CF Intaglio printing of each of the red ink of a SME system, green ink, and blue ink is carried out, and it is formed.

[0047] [Example 2] the back plate plate for liquid crystal displays concerning this example White layer 2' uniformly prepared in the screen-display field on a glass substrate 1 and this glass substrate 1 with a thickness of 1.1mm as shown in drawing 3 , The black matrix 6 with a thickness of about 1.2 micrometers prepared at least for pixel Mabe on this white layer 2', The color filter layers 3R, 3G, and 3B of three colors (red, green, blue) with a thickness of about 1.2 micrometers prepared in the part corresponding to the pixel pattern on above-mentioned white layer 2' in the shape of a stripe, The flattening layer 7 with a thickness of about 1 micrometer which consists of the epoxy system transparence photopolymer (resin with which phenol novolak resin was made into the frame, and photosensitivity was given) which covers these color filter layers 3R, 3G, and 3B and the front face of the black matrix 6, buries that level difference, and attains surface flattening, That principal part consists of transparent electrodes 4 which consist of ITO with a thickness of 0.30 micrometers which carried out location adjustment and was arranged by these color filter layers 3R, 3G, and 3B in the shape of a stripe.

[0048] In addition, above-mentioned white layer 2', and the color filter layers 3R, 3G, and 3B and a transparent electrode 4 The white layer 2, the color filter layers 3R and 3G which start an example 1, respectively, It is formed like 3B and a transparent electrode 4, and after the black matrix 6 applies a black photopolymer uniformly on above-mentioned white layer 2', according to the FOTORISO process, patterning of it is carried out and it is formed.

[0049] [Example 3] the back plate plate for liquid crystal displays concerning this example it is shown in drawing 4 -- as -- the pixel pattern on a glass substrate 1 and this glass substrate 1 with a thickness of 0.7mm (the shape of a rectangle 90 micrometers wide [1 pixel :] and 310 micrometers long --) The pitch of an array : The white layer 2 of the shape of a rectangle prepared in the part corresponding to 110 micrometers of longitudinal directions, and 330 micrometers of lengthwise directions, Color filter layer 3'R of three colors (red, green, blue) which has the stripe configuration with a width of face of 110

micrometers which this white layer 2 was made to carry out location adjustment, and was prepared in it, and 3 'G, 3' B, this color filter layer 3' -- R, 3'G, and 3' -- that principal part consists of 'black matrices 6 laid under the crevice only corresponding to pixel Mabe on the transparent electrode 4 which consists of ITO with a thickness of 0.24 micrometers arranged in the shape of a stripe on B, and this transparent electrode 4'.

[0050] In addition, the above-mentioned white layer 2 and a transparent electrode 4 are formed like the white layer 2 concerning an example 1, and the transparent electrode 4, respectively, and color filter layer 3'R and 3' 'G, 3' B apply the photopolymer with which the organic pigment was blended, and according to the FOTORISO process, patterning of them is carried out and they are formed.

[0051] Moreover, after applying a black photopolymer uniformly, according to a FOTORISO process, patterning of above-mentioned black matrix 6' is carried out, and it is formed.

[0052] [Example 4] the back plate plate for liquid crystal displays concerning this example The electromagnetic-induction input line 8 which consists of the metal thin film of 20 micrometers of **** prepared in the shape of a stripe on a glass substrate 1 and this glass substrate 1 with a thickness of 0.7mm as shown in drawing 5 , With a thickness of 1.0 micrometers uniformly prepared so that this electromagnetic-induction input line might be concealed white layer 2', The black matrix 6 with a thickness of about 1.0 micrometers prepared at least for pixel Mabe on this white layer 2', By the part corresponding to the pixel pattern on above-mentioned white layer 2', and the color filter layers 3R, 3G, and 3B of three colors (red, green, blue) with a thickness of about 1.5 micrometers prepared in the direction which intersects perpendicularly with the above-mentioned electromagnetic-induction input line 8 in the shape of a stripe, The flattening layer 7 with a thickness of about 1 micrometer which consists of the epoxy system transparence photopolymer (resin with which phenol novolak resin was made into the frame, and photosensitivity was given) which covers these color filter layers 3R, 3G, and 3B and the front face of the black matrix 6, buries that level difference, and attains surface flattening, That principal part consists of transparent electrodes 4 which consist of ITO with a thickness of 0.25 micrometers which carried out location adjustment and was arranged by these color filter layers 3R, 3G, and 3B in the shape of a stripe.

[0053] Moreover, the above-mentioned electromagnetic-induction input line 8 consists of a chromium metal thin film with a thickness of 0.05 micrometers prepared in the glass substrate 1 side, and a copper thin film with a thickness of 0.25 micrometers by which the laminating was carried out on it, and while an observer observes the display screen, by bringing a magnetic pen close to the part, an electromagnetic-induction current flows to the above-mentioned electromagnetic-induction input line 8, and it enables the input of a signal.

[0054] In addition, it is prepared among above-mentioned each class by white layer 2' and the approach as each class to which an example 2 corresponds, respectively that the black matrix 6, the color filter layers 3R, 3G, and 3B, the flattening layer 7, and a transparent electrode 4 are the same.

[0055] [Example 5] the back plate plate for liquid crystal displays concerning this example The signal line 9 which consists of ITO with a thickness of 0.25 micrometers prepared in the shape of an abbreviation stripe (a continuous line shows that appearance in drawing 7) on a glass substrate 1 and this glass substrate 1 with a thickness of 1.1mm as shown in drawing 6 , this signal line 9 -- concealing -- and a pixel pattern (the shape of a rectangle 300 micrometers wide [1 pixel :] and 300 micrometers long --) By about 1 micrometer in thickness prepared in 330 micrometers of longitudinal directions, 330 micrometers of lengthwise directions, and the part corresponding to drawing 7 for a broken line showing an appearance, The pitch of an array : The rectangle-like white layer 2, The color filter layers 3R, 3G, and 3B of three colors (red, green, blue) with a thickness of about 1.5 micrometers which this white layer 2 is made to carry out location adjustment, and is prepared in it, and has a stripe configuration with a width of face of 300 micrometers, These color filter layers 3R, 3G, and 3B are made to carry out location adjustment, and it is prepared in them. That edge Color filter layer 3R, While extending so that it may be made to project from 3G and 3B to the method of the outside of about 15 micrometers, the extended part The above-mentioned white layer 2 and color filter layer 3R, The principal part consists of transparent electrodes 4 which consist of rectangle-like (rectangle pattern: 315 micrometers by 300 micrometers) ITO by 0.1 micrometers (refer to drawing 6) in thickness which extended to the lower part side along the side face of 3G and 3B, and was connected to the edge of the above-mentioned signal line 9.

[0056] In addition, the white layer 2, the black matrix 6, the color filter layers 3R, 3G, and 3B, and a transparent electrode 4 are formed among above-mentioned each class by the same approach as each class to which an example 2 corresponds, respectively.

[0057]

[Effect of the Invention] According to invention concerning claims 1, 2, and 3 and claims 6 and 7 It

becomes possible for whenever [incident angle / of the incident ray] not to be caused how, but to make the bright display screen observe in all directions of the beam of light which carried out incidence to the picture element part from the observer lateral electrode plate, in order to be scattered on homogeneity by the white layer, and to be reflected and to carry out outgoing radiation from an observer side substrate. And since it is not reflected by the above-mentioned white layer, it also becomes possible to raise the contrast of the display screen of the beam of light which carried out incidence to parts other than a picture element part.

[0058] Moreover, the metallic reflection film is different from the conventional thing prepared uniformly on a substrate side, and the above-mentioned white layer is insulation, and since it does not produce a short circuit among two or more transparent electrodes through this white layer, in case it impresses an electrical potential difference to the transparent electrode of 1 and drives the liquid crystal matter, the screen display of it which other transparent electrodes do not drive and does not have a defect becomes possible.

[0059] Therefore, it has the effectiveness that there is no display defect, it is concerned with the location of the outdoor daylight light source, with the advantage of a reflective mold liquid crystal display maintained, and the back plate plate for liquid crystal displays in which a screen display [be / nothing] with an angle of visibility bright large moreover is possible can be offered.

[0060] Next, since it becomes possible to reduce the impedance at the time of impressing an electrical potential difference to a transparent electrode according to invention which according to invention concerning claim 4 becomes possible [inputting a signal by bringing a magnetic pen close to the display screen] while an observer observes the display screen, and relates to claim 5, it has the effectiveness which can improve the function further by building back plate plates for liquid crystal displays, such as this, into a liquid crystal display.

[Brief Description of the Drawings]

[Drawing 1] The cross-section explanatory view of the back plate plate for liquid crystal displays concerning an example 1.

[Drawing 2] The top view of the back plate plate for liquid crystal displays concerning an example 1.

[Drawing 3] The cross-section explanatory view of the back plate plate for liquid crystal displays concerning an example 2.

[Drawing 4] The cross-section explanatory view of the back plate plate for liquid crystal displays concerning an example 3.

[Drawing 5] The cross-section explanatory view of the back plate plate for liquid crystal displays concerning an example 4.

[Drawing 6] The cross-section explanatory view of the back plate plate for liquid crystal displays concerning an example 5.

[Drawing 7] The flat-surface explanatory view showing the configuration of the signal line of the back plate plate for liquid crystal displays and transparent electrode concerning an example 5.

[Drawing 8] The sectional view of the tooth-back substrate for liquid crystal displays concerning the conventional example.

[Drawing 9] The sectional view of the tooth-back substrate for liquid crystal displays concerning the conventional example.

[Description of Notations]

1 Glass Substrate

2 White Layer

2' White layer

3R Color filter layer

3G Color filter layer

3B Color filter layer

4 Transparent Electrode

5 Alignment Mark

6 Black Matrix

7 Flattening Layer

8 Electromagnetic-Induction Input Line

9 Signal Line